Message

From: Cosler, Doug [Doug.Cosler@TechLawInc.com]
Sent: 5/12/2017 12:35:04 AM
To: d'Almeida, Carolyn K. [dAlmeida.Carolyn@epa.gov]; Bo Stewart [Bo@praxis-enviro.com]; Wayne Miller [Miller.Wayne@azdeq.gov]
CC: Jennings, Eleanor [Eleanor.Jennings@parsons.com]; 'Dan Pope' [DPope@css-inc.com]; Davis, Eva [Davis.Eva@epa.gov]; Brasaemle, Karla [Karla.Brasaemle@TechLawInc.com]; Henning, Loren [Henning.Loren@epa.gov]
Subject: RE: Time of Remediation Estimates for EBR

As Bo mentioned, I just did a peer-review check on his modeling. As part of my review I modified my spreadsheet LNAPL/Bio model to use his equations. However, I didn't model biomass variations with time and used a "lumped" non-benzene parameter ("other" hydrocarbon) as AMEC did. Bo modeled each individual hydrocarbon in the LNAPL. I thought the spreadsheet BoxModel would also make the simulation results more "accessible" to others in the group, and allow quick sensitivity analyses regarding important parameters that control TOR estimates.

As I mentioned in my email a week or so ago, in my view Bo's analyses are excellent and very thorough. In addition, I was able to match his results very closely for his first-order biodegradation estimates and by using a constant biomass in my spreadsheet (using maximum biomass concentrations that he simulated in his analyses). I thought his analyses, documentation, and overall write-up was on the level of a good research paper.

I think AMEC should study Bo's modeling (and learn from it) and see what they think. Carolyn's suggestion of a concise executive summary also makes sense.

Doug

From: d'Almeida, Carolyn K. [mailto:dAlmeida.Carolyn@epa.gov]
Sent: Thursday, May 11, 2017 7:39 PM
To: Bo Stewart <Bo@praxis-enviro.com>; Wayne Miller <Miller.Wayne@azdeq.gov>
Cc: Jennings, Eleanor <Eleanor.Jennings@parsons.com>; 'Dan Pope' <DPope@css-inc.com>; Davis, Eva <Davis.Eva@epa.gov>; Cosler, Doug <Doug.Cosler@TechLawInc.com>; Brasaemle, Karla <Karla.Brasaemle@TechLawInc.com>; Henning, Loren <Henning.Loren@epa.gov>
Subject: FW: Time of Remediation Estimates for EBR

Thanks Bo; I'm not sure if I saw this before or not, but I certainly did not have time to read it as we were just starting field work when you sent it. I still think we need a much more condensed executive summary for the management team, no more than a 2-3 paragraphs summarizing the variables and range of TOR estimates and the rest will be submitted as appendicies.

Carolyn d'Almeida
Remedial Project Manager
Federal Facilites Branch (SFD 8-1)
US EPA Region 9
(415) 972-3150

"Because a waste is a terrible thing to mind..."

From: Bo Stewart [mailto:Bo@praxis-enviro.com]
Sent: Thursday, May 11, 2017 4:16 PM
To: d'Almeida, Carolyn K. <dAlmeida.Carolyn@epa.gov>

Cc: Wayne Miller <Miller.Wayne@azdeq.gov>
Subject: Fwd: Time of Remediation Estimates for EBR

Hi Carolyn,

In case you missed this email while you were away, I've sent it again. Doug's spreadsheet is a simplified version that would not require much description if accompanied by this memo. I haven't received any comments from Dan or Eva on the memo. I would like to add a preamble to the front of it describing its purpose, limitations, etc before the AF sees it and I could also describe Doug's spreadsheet briefly.

Bo

-------- Forwarded Message --------

Subject: Time of Remediation Estimates for EBR
Date: Tue, 18 Apr 2017 14:48:42 -0700
From: Bo Stewart <Bo@praxis-enviro.com>
Organization: Praxis Environmental Tech., Inc.
To: Steve Willis <steve@uxopro.com>, Wayne Miller <Miller.Wayne@azdeq.gov>, Jennings, Eleanor <Eleanor.Jennings@parsons.com>, d'Almeida, Carolyn K. <dAlmeida.Carolyn@epa.gov>, Davis, Eva <Davis.Eva@epa.gov>, Dan Pope <DPope@css-inc.com>, Brasaemle, Karla <KBrasaemle@TechLawInc.com>, Cosler, Doug <DCosler@TechLawInc.com>

Hi All,

Steve asked me to go ahead and forward the attached memorandum. The memo describes modeling and calculations for the time to attain RAO-like results (averaged over the NAPL source zones) using EBR. The approach is similar to Doug's in his spreadsheet. The model description and mathematical equations (Appendix B) were reviewed by Michael Brooks at EPA ORD (excluding the Monod kinetics) when it was used in the FFS at the McCormack & Baxter Superfund site in 2014. It was also used for the FFS at the Wyckoff Superfund site. I had to add the Monod kinetics to make it applicable to EBR at ST012.

The model is only applied to the EBR targets defined in the Amec Worksheets for the NAPL remaining (LNAPL Volume Calcs Printable_Rev_030317). No attempt was made to evaluate the TTZ/TIZ since no viable mass estimate exists for the residual NAPL remaining after SEE.

For the assumed field conditions and the underlying model assumptions for Monod kinetics, the range of estimates for the LSZ is 8 to 23 years. The calculated range for the UWBZ is 92 to 136 years. Allowing undefined improvements to yield a 10-fold increase to the utilization rates in the UWBZ resulted in a calculated range of 17 to 43 years.

Bo

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Lloyd "Bo" Stewart, PhD, PE
Praxis Environmental Tech., Inc.